

# Survival rate and complications after different types of pelvic exenteration for gynecological cancer

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## Summary

Pelvic exenteration (PE) is an operative method for one-moment removal of pelvic organs, including reproductive tract, bladder, and rectosigmoid. It is most commonly indicated in gynecologic oncology for treatment of locally advanced cancer or recurrence with central localization. The purpose of this study was to evaluate survival rate and complications in different types of PEs performed for cervical, uterine, and ovarian cancer and to report the authors' experience. Patients undergoing PE for cervical, uterine, and ovarian cancer (n=46) were prospectively collected. Operative techniques types included total PE (n=9), anterior PE (n=14), posterior PE (n=7), and modified posterior PE (n=16). Overall intra- and postoperative complication rate was 34.8% for the series. Mild complications occurred in 28.2% and severe complications in 6.5%. Perioperative mortality was 2.2%. PE in patients with advanced stage of gynecological malignancies was associated with high complication rate and high perioperative mortality and morbidity. Therefore, operative techniques with proven safety should be used. Creating ureter anastomosis with incontinent urinary conduit from terminal ileum can be considered as such technique. Although all factors that impact negative on quality of life, PE remains an alternative for extending life of these types of patients.

**Key words:** Pelvic exenteration; Cervical cancer; Ovarian cancer; Endometrial cancer; Complications.

## Introduction

Pelvic exenteration (PE) is an operative method for one-moment removal of pelvic organs, including reproductive tract, bladder, and rectosigmoid. It is most common indicated in gynecologic oncology for treatment of locally advanced cancer or recurrence with central localization. Accurate selection of the patients is of great importance when discussing candidates for PE. Part of the selecting process is appropriate assessment for excluding presence of non-resectable tumor and distant metastasis. PE can be used for healing patients with genital cancer. Frequency of serious complications of the operation reaches 50% [2]. This emphasizes the necessity of careful discussion with the patient regarding the risks and benefits.

PE is connected with the name of Alexander Brunschwig who was born in El Paso, Texas (1901-1969) [1]. In his first report he presents the results of 22 patients operated by PE. Brunschwig applies complex resection of pelvic organs by one-moment abdomino-perineal operation with developing of colostoma and implanting the ureters in the colon before it. The reference shows that he and his team performed 847 operations. When this procedure was initiated, the survival rate did not exceeded eight months with a 23% operative mortality [1]. Results improved after the introduction of separate stomas for urine deviation and fecal evacuation and using omentum as a cover of exposed pelvic walls for

preventing of pelvic abscesses [3, 4].

According to the extent of the operation, PEs are divided in four main groups: 1) total exenteration, 2) anterior exenteration, 3) posterior exenteration, and 4) modified posterior exenteration.

There is a subclassification of these operations according to the level of the pelvic floor: a) over the levator muscles or type I, b) through the levator muscles or type 2, and c) with vulvectomy or type 3

The more radical and respectively engaging the pelvic floor is in the operation, the more difficult it is for the patient to recover and the more high the percentage of intra- and postoperative complications is.

## Materials and Methods

Consecutive women (n=46) undergoing pelvic exenteration by laparotomy in Gynecological department of FSOGH "St. Sofia", Sofia, Bulgaria from February 2008 to March 2015 were included. The operations were performed by one surgeon. The authors performed retrospective analysis after ethical approval from FSOGH "St. Sofia", Sofia, Bulgaria. The number included nine total exenterations, 14 anterior exenterations, seven posterior exenterations, and 16 modified posterior exenterations. Indications for surgery was newly diagnosed patients (n=37) with International Federation of Gynecology and Obstetrics (FIGO) cervical cancer Stage IV (n=26), ovarian cancer FIGO Stage III (n=15), endometrial cancer FIGO Stage III (n=5), and patients with recurrence of the disease (n=9). The median age of the patients was 56.3 (range,

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Table 1. — *Patients characteristics and results of the operative outcomes.*

	n=46
Age, median, years	56.3 (31-79)
BMI, median, kg/m <sup>2</sup>	25.3 (18.4-38.3)
Operative time, median, minutes	246 (190-300)
Operative blood loss, median, mL	1830 (1200-2500)
Hospital stay, median, days	13.3 (9-20)
Follow-up, median, months	52.3 (2.3-99.4)
Type of cancer, Stage	
Cervical, IV	26
Ovarian, III	15
Endometrial, III	5

31-79) years. The median body mass index was 25.3 (range, 18.4-38.3) kg/m<sup>2</sup>. All patients had preoperative CT and 38% were referred for additional MRI for preoperative staging. All patients were followed up to their time of decease or June 2015.

Total exenteration was performed in 19.6% (n=9) of the patients. The access to the abdomen was by total median laparotomy. Notwithstanding the preoperative evaluation of the cancer stage, final decision for the extent of surgery was made after intraoperative evaluation of the tumor and its spread by review and palpation of the organs. After removing of the tumor along with the bladder and rectum, reconstructive techniques for repair of the intestinal and urine passage were applied. In all nine cases the rectum was removed by abdomino-perineal resection and anal preternaturalis. Vulvectomy with full closure of the perineum was made without any reconstructions for creating of the neovagina. Urinary deviations were made by modeling of urinary conduit from a terminal ileum segment with anastomosis of both ureters. It was expanded to the right abdominal wall 4-5 cm from the midline. In two cases modeling of the conduit was used made from a segment from colon transversum because of obviously damaged ileum due to previous radiotherapy. Techniques for creating of continent urinary conduits were not used in preference to incontinent urinary conduit, which is the more safe and less time-consuming technique [3]. In two cases the pelvic floor was covered by omentum majus.

Anterior exenteration that including removal of external genitalia and the bladder occurred in 30.4% of the patients (n=14). The operative approach was by low median laparotomy extending 5-8 cm over the umbilicus. Intraoperative evaluation for preserving the rectum or its partial resection was made. This decision depended on whether the anterior rectal wall was able to be dissected from the vaginal wall and the cervix. If this was possible, the operation continued as anterior exenteration, if not it continued as total exenteration. In that case the rectum could be removed totally, partial resection could be done, or only resection of the part of the rectal wall. The reconstructive part of the operation consisted of creating urinary conduit by the method described above and reconstruction of the intestinal passage with anastomosis or suturing of the rectal wall.

Posterior or modified posterior exenteration [5, 6] was performed in 50% of the cases (n=23). The technical approach was by total median laparotomy. After disquisitional staging with peritoneal cytology and biopsy from different parts of the abdomen, surgery proceeded with extraperitoneal removing of the pelvic tumor including internal genitalia with the ovarian tumor and the engaged in the process part of sigma and rectum. Resection line in 18 cases was above levator muscles. In two cases internal and external anal sphincters needed to be removed. In the cases with resection over the levator muscle, the intestinal passage was re-

stored by anastomosis in two layers with separated stitches (no staplers were used). In cases with engaged sphincter or by discretion that the general condition was ventured for insufficient anastomosis (low serum proteins or age), anal preternaturalis was created.

Statistical calculations were performed using SPSS software, version 13.0. The Kaplan-Meier method is used to estimate overall survival (OS). OS was the time between diagnosis and death of any cause. Cases without events were censored on July 3, 2015.

Patient and perioperative characteristics are summarized in Table 1. Operative time was measured from skin to skin. The median duration of the operation was 246 (range, 190-300) minutes. All patients were operated by total or low and mid median laparotomy. All of the patients received intra and/or postoperative blood transfusion. In 39.1% (n=18) of the cases, anastomosis between different parts of the intestine and/or colon were made. Anal preternaturalis developed in 21.7% (n=10). Reconstruction of the urine passage through urinary conduit was made in 50% (n=23) of the operations, *i.e.* in all cases with total and anterior exenteration. All total PE and anterior PE were performed in patients with cervical cancer. In the posterior PE group, two patients had cervical cancer, one had endometrial cancer, and four had ovarian cancer. The modified posterior PE group consisted of one patient with cervical cancer, four patients with endometrial cancer, and 11 with ovarian cancer.

Estimated blood loss was calculated by measuring the difference between the volumes of aspirated and irrigated fluids and the blood in the gauzes. The median blood loss was 1,830 (1200-2500) mL. The median level of hemoglobin on postoperative day 7 was 105.5 (90-120) g/L. All patients were treated with antibiotics from five to seven days after operation and low molecular heparine until day 30 after operation.

The median hospital stay was 13.3 (9-20) days. In this series, all patients received one or two abdominal drainages for three to six days and a bladder catheter for 7-14 days postoperatively.

## Results

Intraoperative complications occurred in three patients. Bleeding from the left iliac region occurred in two patients with estimated blood loss (EBL) of 2,100 ml. One patient had bleeding from lesion of the vena cava that was sutured with participation of vascular surgeon (EBL, 2,500 ml). Postoperative complications were recorded for the first 30 postoperative days. Deaths due to complication in the group was 2.2%. Thirteen patients (28.3%) have postoperative complication of first degree. One patient (2.2%) in the group had second-degree complication – thromboembolic process and insult. One patient in the group with anterior exenteration developed on postoperative day 8 peritonitis due to lesion of the rectum. Reoperation with developing of anal preternaturalis was performed. Although all kinds of therapeutic and reanimation measures were made, the patient died on day 20. In total three patients had dehiscence of the intestine anastomosis which were treated by reoperation and reanastomosis. One reoperation was made because of pelvic abscess. The remaining patients did not have heavy complications. The most frequent complication of pelvic exenteration was lymphorrhea from the pelvic floor between the stitches (in ten patients) that was com-

Table 2. — *Pathological results.*

Morphological type	Cervical	Endometrial	Ovarian	Total
Squamous cell	24	0	0	24
Adenocarcinoma	1	0	0	1
Adenosquamous	1	1	0	1
Endometroid	0	4	1	5
Serous cystadenocarcinoma	0	0	5	5
Serous papillary carcinoma	0	0	8	8
Mucinous adenocarcinoma	0	0	1	1
Total	26	5	15	46

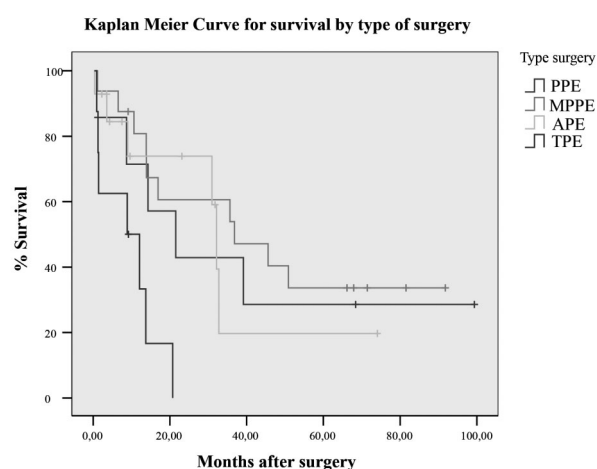


Figure 1. — Kaplan-Meier curve for OS for different type of PE.

plicated with infection in four cases. The therapeutic scheme included drainage and lavage with antiseptic until recovering of the intact tissue. In the group with anterior exenteration, five patients (35.7%) suffered from mild small intestine ileus which was treated with conservative therapy. All of the ureteral conduit anastomoses did not have complications. Overall intra- and postoperative complication rate was 34.8 % for the series. Percentage of mild complications was 28.2% and for severe complications it was 6.5%.

The types of cancer distribution were cervical cancer FIGO Stage IV (26 patients), ovarian cancer FIGO Stage III (15 patients), and endometrial cancer FIGO Stage III (five patients). Pathological results are summarized in Table 2.

Histologic types for cervical cancer were squamous cell carcinoma (92.3%) adenocarcinoma (3.8%), and adenosquamous (3.8%). Ovarian cancer histologic types were endometroid (6.7%), serous cystadenocarcinoma (33.3%), serous papillary carcinoma (53.3%), and mucinous adenocarcinoma (6.7%). Distribution of histologic type for endometrial cancer was endometroid (80%) and carcinosarcoma (20%)

Forty patients underwent postoperative treatment: 15 pa-

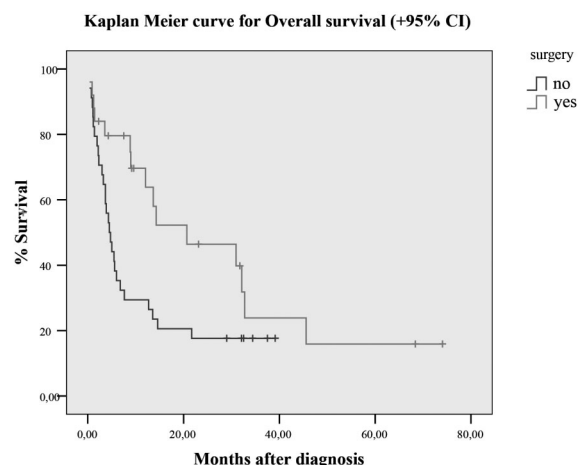


Figure 2. — Kaplan-Meier curve for OS for operated and non-operated patients with cervical cancer.

tients received chemotherapy (37.5%), 24 (60%) received radiotherapy, and one patient (2.5%) received radiochemotherapy.

The median follow-up was 52.3 (range, 2.3-99.3) months. Recurrence was observed in ten patients (21.7%), of which two patients were in Stage III, and eight in Stage IV. The two-year OS percentage was 49.6% (standard error 0.08), and the five-year OS percentage was 24.9% (standard error 0.07). The two- and five-year OSs were 73.9% and 24.6% for anterior PE, 42.8% and 28.6% for posterior PE and 60.5% and 33.6% for modified posterior PE, respectively. For the group with total PE, four of these nine patients died in the first year (44.4%) and another three in the second year (77.8% in total). For different types of surgery survival functions are presented in Figure 1. Exenterations for cervical carcinoma were performed in 26 cases with FIGO Stage IIIB and IV. To compare the survival time for patients that unsertwent surgery with similar group with no surgery, the authors used data from the National Oncologic Register. For year 2012, 34 patients with cervical carcinoma with no treatment were registered. Their survival time was calculated with the same statistical method (Kaplan-Mayer). The two groups were statistically compatible for the stage of disease, age, and physical data of the patients. The results show that the group with operative treatment had a median survival time of 27 (range, 15.9-38.7) months and the group with no treatment had a median survival time of 11 (range, 6.5-15.7) months with statistically significant difference  $p = 0.03$  (Figure 2).

## Discussion

PE is an operation that is performed most commonly in cases with recurrence of the disease after previous operative treatment with concomitant adjuvant treatment [7, 8].

Recurrence was observed in ten patients (21.7%), of which two patients were in Stage III and eight in Stage IV. The recurrence rate reported in literature is between 38% and 60% [9-11]. The recurrence-free rate of 78.3% is also comparable with rates varying from 40–78% in the literature [5, 9].

The two-year OS percentage was 49.6% (standard error 0.08), which is similar to that published by Benn *et al.* [12], and the five-year OS was 24.9%. In the literature five-year OS rate in different series was reported to be between 20% and 61.4% [10, 12-18]. Westin *et al.* report in series of 160 patients that had PE five-years OS of 40% and found factors that negatively impacted OS, including positive margins, lymphovascular space invasion, positive lymph nodes, and perineural invasion [19]. All of the total PE in the present study were performed due to cervical cancer. Worldwide the majority of total PE in gynecological was performed in recurrent cervical cancer [5, 6, 9, 10]. The major early postoperative complications included blood loss, sepsis, wound dehiscence, and anastomotic breakdown at the level of the bowel, urinary pouch, or ureteral sites [20, 21].

Urinary deviations were made with ileal conduit as described by Bricker [3]; only in three cases a segment of transversal colon was used. All ureteral anastomosis in conduit did not have complications and can be considered as safety surgical procedure. In the literature urinary complications are reported to reach 14% [10, 22-24]. Houvenaeghel *et al.* reported no reoperations for urinary complications in group with urinary conduit and showed that this was the most safety procedure compared with other methods of urinary diversion [22]. In the present series, there were two cases with compromised intestinal anastomosis. In first case a successful reanastomosis was made and in second an ileostoma was developed because of leakage of anastomosis of the colon. There were two cases of compromised low colorectal anastomosis in the group with modified PE. The rate of complications (23%) corresponds with such reported in literature [6, 25-27]. Feren-schild *et al.* reported 34% major complications and 57% minor complications. Goldberg *et al.* published 14% ureteral anastomosis leakages, 17% wound complications, and 4% parastomal hernias [28]. Symptomatic pulmonary embolism occurred in 1-5% [29]. In the present series there was one patient with thromboembolic process and insult. One of the most serious complications related with high morbidity and mortality is intestinal obstruction and fistula. Reoperation for small intestine fistula has perioperative mortality [30].

In conclusion, PE in patients with advanced stage of gy-

necological malignancies is associated with high complication rate and high perioperative mortality and morbidity. Therefore, operative techniques with proven safety should be used. Creating ureter anastomosis with incontinent urinary conduit from terminal ileum can be considered as such technique. Although all factors that impact negative on quality of life, PE remains alternative for extending life of this kind of patients.

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